Application No.: 10/674,022
Amendment dated: 109/19/06
Reply to Office Action mailed: 06/20/06

Amendments to the Claims:

Claims 1, 9, 13, 19, 21 and 22 have been amended.

Claim 8 has been cancelled.

Claims 1-7, 9-11 and 13-23 are presently pending in this Application.

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (previously and currently amended) A reduced carbon dioxide emissions method for providing power for refrigerant compression and shared electrical power for a light hydrocarbon gas liquefaction process, the method comprising:

a) compressing a refrigerant in a refrigerant compressor at least partially driven by [at least one] a light hydrocarbon gas-fired turbine to produce [a] all of the compressed refrigerant for the light hydrocarbon gas liquefaction process with the turbine producing power solely for driving the compressor and an exhaust gas stream at [an] a resulting elevated temperature;

b) passing all of the resulting exhaust gas stream to a heat exchanger and producing steam at an elevated temperature and pressure from water or low-pressure steam by heat exchange with the exhaust gas stream;

c) driving a steam turbine unconnected mechanically to the light hydrocarbon gas-fired turbine or refrigerant compressor with the steam from b); and,

d) driving an electrical power generator with the steam from b) to produce electrical power for use in the light hydrocarbon gas liquefaction process.

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2. (original) The method of claim 1 wherein a plurality of refrigerant compressors and turbines are used.

3. (previously amended) The method of claim 1 wherein the gas-fired turbine is fueled by a compressed air stream and a light hydrocarbon gas stream.

4. (previously amended) The method of claim 3 wherein the air stream and the light hydrocarbon gas stream are combusted to produce a high-temperature, high-pressure gas stream which drives the gas-fired turbine.

5. (original) The method of claim 3 wherein the compressed air stream is produced by an axial compressor or a centrifugal compressor.

6. (original) The method of claim 1 wherein the electrical power is used on the electrical grid for the light hydrocarbon gas liquefaction process.

7. (previously amended) The method of claim 1 wherein the gas-fired turbine is partially driven by a starter/helper electric motor which is coupled to the turbine.

8. (cancelled)

9. (currently amended) The method of claim 1 wherein the carbon dioxide emissions from the light hydrocarbon gas liquefaction process are reduced by [up to about sixty] <u>at least 35</u> percent by comparison to a comparable plant wherein the exhaust gas stream is used for other purposes and wherein electrical power produced by fossil fuel combustion is used as the primary source of electrical power for the electrical grid.

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10. (original) The method of claim 1 wherein the light hydrocarbon gas is natural gas.

11. (original) The method of claim 10 wherein at least a portion of the acid gases and at least a portion of hydrocarbon gases heavier than about C_3 have been removed from the natural gas.

12. (previously cancelled)

13. (currently amended) A reduced carbon dioxide emission system for providing power for refrigerant compression and shared electrical power for a light hydrocarbon gas liquefaction process:

a) a refrigerant compressor having a low-pressure gaseous refrigerant inlet and an increased pressure refrigerant outlet and shaft coupled to and driven by a light hydrocarbon gas-fired turbine with the turbine having a high-temperature exhaust gas outlet, the refrigerant compressor compressing all the compressed refrigerant for the light hydrocarbon gas liquefaction process;

b) a heat exchanger having a water or a low-pressure steam inlet and a high-pressure steam outlet and a high-temperature exhaust gas inlet in fluid communication with the high-temperature exhaust gas outlet and a reduced temperature exhaust gas outlet so that all of the high-temperature exhaust gas passes in heat exchange with the water or low-pressure steam to produce high-pressure steam;

c) an electric generator unconnected mechanically to the refrigerant compressor or the light hydrocarbon gas-fired turbine and driven by the high-pressure steam to produce electrical power for use in the light hydrocarbon gas liquefaction process; and,

d) a line in fluid communication with the increased pressure refrigerant outlet and a compressed refrigerant inlet to the light hydrocarbon gas liquefaction process.

14. (original) The system of claim 13 wherein the system includes a plurality of compressors, turbines, heat exchangers and electric generators.

15. (original) The system of claim 13 wherein the turbine includes an inlet for a high-pressure air stream.

16. (original) The system of claim 13 wherein an axial compressor or a centrifugal compressor is coupled to the turbine to produce a high-pressure air stream.

17. (original) The system of claim 16 wherein the system includes a combustion zone having a high-pressure air stream inlet and a light hydrocarbon gas inlet wherein the high-pressure air stream and the light hydrocarbon gas stream are combusted to produce the high-pressure gas stream.

18. (original) The system of claim 13 wherein the low-pressure gaseous refrigerant is recovered from a refrigerant discharge outlet from the light hydrocarbon gas liquefaction process and passed to the low-pressure gaseous refrigerant inlet.

19. (currently amended) The system of claim 13 wherein the carbon dioxide emissions from the light hydrocarbon gas liquefaction process are reduced by [up to about sixty] at least 35 percent by comparison to a comparable plant wherein the exhaust gas stream is used for other purposes and wherein electrical power produced by fossil fuel combustion is used as the primary source of electrical power for the electrical grid.

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20. (original) The system of claim 13 wherein the system includes an electrical motor shaft coupled to the turbine with the electrical motor being at least partially powered by electricity produced by the electric generator.

21. (currently amended) A reduced carbon dioxide emissions method for providing power for refrigerant compression and shared electrical power for a light hydrocarbon gas liquefaction process from which the carbon dioxide emissions are reduced by from about thirty-five to about sixty percent, the method consisting essentially of:

a) compressing a refrigerant in a refrigerant compressor at least partially driven by [at least one] a light hydrocarbon gas-fired turbine to produce [a] all of the compressed refrigerant for the light hydrocarbon gas liquefaction process with the turbine producing power solely for driving the compressor and an exhaust gas stream at [an] a resulting elevated temperature;

b) passing all of the resulting exhaust gas stream to a heat exchanger and producing steam at an elevated temperature and pressure from water or low-pressure steam by heat exchange with the exhaust gas stream;

c) driving a steam turbine unconnected mechanically to the light hydrocarbon gas-fired turbine or refrigerant compressor with the steam from b); and,

d) driving an electrical power generator with the steam from b) to produce electrical power for use in the light hydrocarbon gas liquefaction process.

22. (currently amended) A reduced carbon dioxide emission system for providing power for refrigerant compression and shared electrical power for a light hydrocarbon gas liquefaction process from which the carbon dioxide emissions are reduced by from about thirty-five to about sixty percent, the system comprising:

a) a refrigerant compressor having a low-pressure gaseous refrigerant inlet and an increased pressure refrigerant outlet and shaft coupled to and driven by a light hydrocarbon gas-fired turbine with the turbine having a high-temperature exhaust gas outlet, the refrigerant compressor compressing all the compressed refrigerant for the light hydrocarbon gas liquefaction process;

b) a heat exchanger having a water or a low-pressure steam inlet and a high-pressure steam outlet and a high-temperature exhaust gas inlet in fluid communication with the high-temperature exhaust gas outlet and a reduced temperature exhaust gas outlet so that all of the high-temperature exhaust gas passes in heat exchange with the water or low-pressure steam to produce high-pressure steam;

c) an electric generator unconnected mechanically to the refrigerant compressor or the light hydrocarbon gas-fired turbine and driven by the high-pressure steam to produce electrical power for use in the light hydrocarbon gas liquefaction process; and,

d) a line in fluid communication with the increased pressure refrigerant outlet and a compressed refrigerant inlet to the light hydrocarbon gas liquefaction process.